FBN2 gene

fibrillin 2

Normal Function

The *FBN2* gene provides instructions for making a large protein called fibrillin-2. This protein is transported out of cells into the extracellular matrix, which is an intricate lattice of proteins and other molecules that forms in the spaces between cells. In this matrix, fibrillin-2 binds to other proteins to form threadlike filaments called microfibrils. Microfibrils become part of elastic fibers which enable the skin, ligaments, and blood vessels to stretch. Researchers have suggested that fibrillin-2 plays a role in directing the assembly of elastic fibers during embryonic development. Microfibrils also contribute to more rigid tissues that support the lens of the eye, nerves, and muscles. Additionally, microfibrils hold certain growth factors called transforming growth factor-beta (TGF-beta) proteins, which keeps them inactive. When released from microfibrils, TGF-beta growth factors are activated and affect the growth and repair of tissues throughout the body.

Health Conditions Related to Genetic Changes

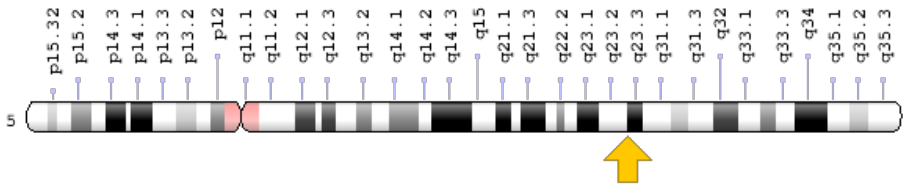
congenital contractural arachnodactyly

More than 20 mutations in the *FBN2* gene have been found to cause congenital contractural arachnodactyly. Most of these mutations change one protein building block (amino acid) in the fibrillin-2 protein, usually replacing the amino acid cysteine with a different amino acid. The substitution of another amino acid for cysteine can alter the structure or function of fibrillin-2. Most other *FBN2* mutations disrupt the way the *FBN2* gene's instructions are used to make the fibrillin-2 protein. All of these mutations reduce the amount of fibrillin-2 available to form microfibrils. Decreased microfibril formation probably weakens the elastic fibers and causes overactivation of TGF-beta growth factors, which leads to the signs and symptoms of congenital contractural arachnodactyly.

Chromosomal Location

Cytogenetic Location: 5q23.3, which is the long (q) arm of chromosome 5 at position 23.3

Molecular Location: base pairs 128,257,908 to 128,538,358 on chromosome 5 (Homo sapiens Annotation Release 108, GRCh38.p7) (NCBI)



Credit: Genome Decoration Page/NCBI

Other Names for This Gene

- CCA
- DA9
- FBN2_HUMAN
- fibrillin 2 (congenital contractural arachnodactyly)

Additional Information & Resources

Educational Resources

- Eurekah Bioscience: Interaction Epitopes Important for Fibrillin Assembly https://www.ncbi.nlm.nih.gov/books/NBK5960/#A22112

GeneReviews

- Congenital Contractural Arachnodactyly https://www.ncbi.nlm.nih.gov/books/NBK1386

Scientific Articles on PubMed

- PubMed https://www.ncbi.nlm.nih.gov/pubmed?term=%28%28FBN2%5BTIAB%5D%29+OR+%28fibrillin+2%5BTIAB%5D%29%29+AND+%28%28Genes%5BMH%5D%29+OR+%28Genetic+Phenomena%5BMH%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+720+days%22%5Bdp%5D

OMIM

- FIBRILLIN 2
  http://omim.org/entry/612570

Research Resources

- Atlas of Genetics and Cytogenetics in Oncology and Haematology
  http://atlasgeneticsoncology.org/Genes/GC_FBN2.html
- ClinVar
  https://www.ncbi.nlm.nih.gov/clinvar?term=FBN2%5Bgene%5D
- HGNC Gene Symbol Report
  http://www.genenames.org/cgi-bin/gene_symbol_report?q=data/hgnc_data.php&hgnc_id=3604
- NCBI Gene
  https://www.ncbi.nlm.nih.gov/gene/2201
- UniProt
  http://www.uniprot.org/uniprot/P35556

Sources for This Summary

- Frédéric MY, Monino C, Marschall C, Hamroun D, Faivre L, Jondeau G, Klein HG, Neumann L, Gautier E, Binquet C, Maslen C, Godfrey M, Gupta P, Milewicz D, Boileau C, Claustres M, Béroud C, Collod-Béroud G. The FBN2 gene: new mutations, locus-specific database (Universal Mutation Database FBN2), and genotype-phenotype correlations. Hum Mutat. 2009 Feb;30(2):181-90. doi: 10.1002/humu.20794.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/18767143
- Gupta PA, Putnam EA, Carmical SG, Kaitila I, Steinmann B, Child A, Danesino C, Metcalfe K, Berry SA, Chen E, Delorme CV, Thong MK, Adès LC, Milewicz DM. Ten novel FBN2 mutations in congenital contractural arachnodactyly: delineation of the molecular pathogenesis and clinical phenotype. Hum Mutat. 2002 Jan;19(1):39-48.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/11754102
- Gupta PA, Wallis DD, Chin TO, Northrup H, Tran-Fadulu VT, Towbin JA, Milewicz DM. FBN2 mutation associated with manifestations of Marfan syndrome and congenital contractural arachnodactyly. J Med Genet. 2004 May;41(5):e56.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/15121784
  Free article on PubMed Central: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1735765/
- Nishimura A, Sakai H, Ikegawa S, Kitoh H, Haga N, Ishikiriyama S, Nagai T, Takada F, Ohata T, Tanaka F, Kamasaki H, Saitsu H, Mizuguchi T, Matsumoto N. FBN2, FBN1, TGFBR1, and TGFBR2 analyses in congenital contractural arachnodactyly. Am J Med Genet A. 2007 Apr 1;143A(7):694-8.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17345643
- Ramirez F, Dietz HC. Fibrillin-rich microfibrils: Structural determinants of morphogenetic and homeostatic events. J Cell Physiol. 2007 Nov;213(2):326-30. Review.
  Citation on PubMed: https://www.ncbi.nlm.nih.gov/pubmed/17708531

Reprinted from Genetics Home Reference:
https://ghr.nlm.nih.gov/gene/FBN2

Reviewed: July 2013
Published: March 21, 2017

Lister Hill National Center for Biomedical Communications
U.S. National Library of Medicine
National Institutes of Health
Department of Health & Human Services